

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1, 4-17 and 19 are active in the application and of these claims 1 and 19 are directed to elected subject matter.

The claims have been amended in order to more particularly point out and distinctly claim that which applicants regard as their invention and to direct them to preferred aspects of the disclosure. More specifically, the subject matter of claims 3 and 18 has been incorporated into claim 1 and as consequence claim 2 has been canceled as redundant as well as claims 3 and 18. The dependency of claim 19 is amended to depend from claim 1. The significance of these amendments will be apparent from the remarks that follow.

The current Official Action examines only claims 1-3, 18 and 19, the remaining claims 4-17 stand withdrawn from consideration. The sole issue presented is the rejection in item 4 based upon a combination of three documents one of which is newly cited.

Response to 35 USC §103(a) Rejection

In the Office Action, page 3, paragraph 4, claims 1 to 3, 18 and 19 are rejected as being “obvious” over Nakashima et al (US 2002-0010066) and Miyamoto (US 6,395,634) taken with newly cited Takei et al (JA 2002-201040).

Applicants disagree and have amended their claims to further distinguish them from this combination of references.

Nakashima et al disclose a substrate for a data storage medium such as a magnetic disc (col. 1, [0002]), and are in agreement in technical field with amended claim 1 that also relates to a substrate for an information recording medium.

However, as admitted by the Examiner, Nakashima et al do not describe anything concerning “a glass ... having an etching rate of 0.1 $\mu\text{m}/\text{minute}$ or less with regard to a hydrosilicofluoric acid aqueous solution that is maintained at a temperature of 45°C and has a hydrosilicofluoric acid concentration of 1.72 % by weight.” In fact, Nakashima et al take nothing into consideration with regard to the acid resistance of the substrate.

Further, differing entirely from what is held by the Examiner, the glass composition defined in amended claim 1 is entirely different from the glass composition disclosed by Nakashima et al. This point will be specifically explained below.

Amended claim 1 defines the glass composition by mol%, and claim 1 of Nakashima et al define a glass composition by mass%, yet even when these two glass compositions are compared, it cannot be judged whether or not they are the same or different. The glass compositions of Examples 1–15 described in TABLE I are all that can be compared with the glass composition of amended claim 1 when they are converted from mass% to mol%.

Therefore, applicants have prepared and submit herewith a Table (three sheets) of conversions from mass% to mol% with regard to glass compositions of Examples 1-15 of Nakashima et al.

As is clear from the attached Table, of the glass compositions of Examples of Nakashima et al, the glass compositions of Examples 1-7 and 9-15 are not included in the glass composition of amended claim 1 in that the BaO content is 0 mol%. There is only one glass composition containing BaO in Nakashima et al and it is the composition of Example 8 in which the $\text{CaO}/(\text{MgO}+\text{CaO}+\text{SrO}+\text{BaO})$ ratio is 0.43875. The glass composition of Example 8 is not included in the glass composition of amended claim 1 in which the above ratio (previously set out in claim 18) is 0.5 or more.

The glass composition defined in amended claim 1 has characteristic features in that BaO is an essential component by specifying that its content is more than 0 but not more than 15%, and that the ratio of CaO of the alkaline earth metal oxides is a half or more by specifying that $\text{CaO}/(\text{MgO}+\text{CaO}+\text{SrO}+\text{BaO})$ is 0.5 or more. For the above-discussed reasons, it is clear that Nakashima et al do not disclose the glass composition defined in amended claim 1.

Miyamoto is cited together with Nakashima et al merely discloses that a glass substrate for magnetic recording medium is surface-treated with a hydrosilicofluoric acid solution. This is utterly another matter different from the parameter of “an etching ratio of 0.1 $\mu\text{m}/\text{minute}$ or less with regard to a hydrosilicofluoric acid aqueous solution that is maintained at a temperature of 45°C and has a hdyrosilicofluoric acid concentration of 1.72 % by weight” defined in amended claim 1 as a measure for evaluating the acid resistance of a substrate for information recording medium.

Therefore, amended claim 1 is not suggested by any combination of Miyamoto with the Nakashima et al.

Takei et al, newly cited and "listed" as a third reference, relate to an aluminoborosilicate glass, and this aluminoborosilicate glass contains B_2O_3 as an essential component together with SiO_2 and Al_2O_3 and is hence clearly different from the glass composition defined in amended claim 1 which does not contain B_2O_3 as an essential component.


Therefore, amended claim 1 is not obvious over Nakashima et al and Miyamoto in view of Takei et al.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Applicants have taken care to compare their claims to the specific data included in the applied reference as compared to the claims of the present application as above amended. Should the examiner have any questions or require further information, please contact the undersigned.

Respectfully submitted,

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mass%

Component	1	2	3	4	5
SiO2	51.3	52	55.1	53.1	52.7
B2O3	0	0	0	2.2	0
Al2O3	12.6	12.6	13.3	13	14.4
Li2O	0	0	0	0	0
Na2O	4.8	4.5	5.3	4.5	4.6
K2O	6.7	6.8	5.5	6.8	7.6
MgO	2.6	2.8	5.2	3.2	3.2
CaO	4.1	4.1	7.7	8	7.7
SrO	10.6	12.4	2.4	4	4.6
BaO	0	0	0	0	0
TiO2	5.2	4.8	5.5	2.4	2.4
ZrO2	2.1	0	0	2.8	2.8
Total	100	100	100	100	100

mol%

Component	claim 1	1	2	3	4	5
SiO2	>0%	58.96114	59.43087	59.17328	58.87291	58.97922
B2O3		0	0	0	2.106245	0
Al2O3	>0%	8.532836	8.485035	8.415888	8.49256	9.495662
Li2O	0%	0	0	0	0	0
Na2O	>0%	5.347768	4.985447	5.517377	4.836334	4.990328
K2O	>0%	4.913002	4.958397	3.768429	4.810093	5.426572
MgO		4.456473	4.772393	8.328117	5.291032	5.340819
CaO		5.048287	5.020006	8.85883	9.502165	9.231893
SrO		7.067554	8.221389	1.495202	2.572739	2.98649
BaO	>0%	0	0	0	0	0
TiO2		4.495516	4.126461	4.442878	2.00152	2.020354
ZrO2		1.177421	0	0	1.514408	1.528658
Total		100	100	100	100	100
CaO/(MgO+CaO+SrO+BaO)	≥0.5	0.304622	0.278676	0.5474187	0.547173	0.525758

Difference

mass%

Component	6	7	8	9	10
SiO2	54.6	52.8	43.9	58.5	51.5
B2O3	0	3.1	0	0	0.5
Al2O3	13.2	8.3	16.5	6.4	16
Li2O	0	0	0	0	0
Na2O	4.7	4.6	2.3	4.7	5
K2O	7.1	6.9	2.5	7	6.2
MgO	6	2.8	2.6	5.1	2.4
CaO	4.3	4.1	8.9	5	6.9
SrO	5.1	12.6	14	8.3	9.2
BaO	0	0	0.5	0	0
TiO2	5	4.8	8.8	5	0
ZrO2	0	0	0	0	2.3
Total	100	100	100	100	100

mol%

Component	claim 1	6	7	8	9	10
SiO2	>0%	59.51766	59.51535	51.16795	63.01767	58.79546
B2O3		0	3.017324	0	0	0.492915
Al2O3	>0%	8.478157	5.512485	11.33161	4.062195	10.76294
Li2O	0%	0	0	0	0	0
Na2O	>0%	4.96631	5.026153	2.598628	4.907803	5.533365
K2O	>0%	4.937819	4.962125	1.859076	4.81092	4.515978
MgO		9.753801	4.706765	4.519353	8.193059	4.086177
CaO		5.021498	4.950973	11.1131	5.770163	8.439122
SrO		3.225062	8.23911	9.466213	5.186798	6.093111
BaO	>0%	0	0	0.228921	0	0
TiO2		4.099689	4.069715	7.715142	4.051391	0
ZrO2		0	0	0	0	1.280938
Total		100	100	100	100	100
CaO/(MgO+CaO+SrO+BaO)	≥0.5	0.278967	0.276639	0.438775	0.301314	0.453268

 Difference

mass%

Component	11	12	13	14	15
SiO2	54.2	52.1	53.1	52.8	52.8
B2O3	0	0	0	0	0
Al2O3	12.5	13.5	13.3	13.4	13.4
Li2O	0	0	0.4	0.4	0.4
Na2O	4.5	4.6	6.3	7	6.3
K2O	6.8	5.7	4.1	3.2	4
MgO	1	3	2.9	3.7	3.6
CaO	4	7.9	0	0	0
SrO	12.3	9.5	13.5	14	14
BaO	0	0	0	0	0
TiO2	4.7	1	4.6	4.1	4.1
ZrO2		2.7	1.8	1.4	1.4
Total	100	100	100	100	100

mol%

Component	claim 1	11	12	13	14	15
SiO2	>0%	62.50507	58.75871	61.06216	60.18073	60.39915
B2O3		0	0	0	0	0
Al2O3	>0%	8.493766	8.971035	9.011634	8.999174	9.031836
Li2O	0%	0	0	0.927675	0.919479	0.922816
Na2O	>0%	5.030501	5.028925	7.022649	7.734004	6.985866
K2O	>0%	5.003207	4.101408	3.00805	2.327004	2.919312
MgO		1.71983	5.045744	4.973304	6.28919	6.141421
CaO		4.941828	9.54494	0	0	0
SrO		8.228787	6.215454	9.005879	9.256916	9.290513
BaO	>0%	0	0	0	0	0
TiO2		4.077008	0.848325	3.978901	3.515079	3.527837
ZrO2		0	1.485464	1.00975	0.778422	0.781248
Total		100	100	100	100	100
CaO/(MgO+CaO+SrO+BaO)	≥0.5	0.331879	0.458756	0	0	0

Difference

mass%

Component	11	12	13	14	15
SiO2	54.2	52.1	53.1	52.8	52.8
B2O3	0	0	0	0	0
Al2O3	12.5	13.5	13.3	13.4	13.4
Li2O	0	0	0.4	0.4	0.4
Na2O	4.5	4.6	6.3	7	6.3
K2O	6.8	5.7	4.1	3.2	4
MgO	1	3	2.9	3.7	3.6
CaO	4	7.9	0	0	0
SrO	12.3	9.5	13.5	14	14
BaO	0	0	0	0	0
TiO2	4.7	1	4.6	4.1	4.1
ZrO2		2.7	1.8	1.4	1.4
Total	100	100	100	100	100

mol%

Component	claim 1	11	12	13	14	15
SiO2	>0%	62.50507	58.75871	61.06216	60.18073	60.39915
B2O3		0	0	0	0	0
Al2O3	>0%	8.493766	8.971035	9.011634	8.999174	9.031836
Li2O	0%	0	0	0.927675	0.919479	0.922816
Na2O	>0%	5.030501	5.028925	7.022649	7.734004	6.985866
K2O	>0%	5.003207	4.101408	3.00805	2.327004	2.919312
MgO		1.71983	5.045744	4.973304	6.28919	6.141421
CaO		4.941828	9.54494	0	0	0
SrO		8.228787	6.215454	9.005879	9.256916	9.290513
BaO	>0%	0	0	0	0	0
TiO2		4.077008	0.848325	3.978901	3.515079	3.527837
ZrO2		0	1.485464	1.00975	0.778422	0.781248
Total		100	100	100	100	100
CaO/(MgO+CaO+SrO+BaO)	≥0.5	0.331879	0.458756	0	0	0

Difference